

The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID P. MERRITT, WAYNE M. MOREAU
and ROBERT L. WOOD

Appeal No. 2002-1144
Application No. 09/422,633

ON BRIEF

Before KIMLIN, GARRIS and POTEATE, Administrative Patent Judges.
KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-11
and 23, all the claims remaining in the present application.

Claim 1 is illustrative:

1. An improved positive working resist composition comprising a polymer having functional groups pendant thereto which contribute to the solubility of the polymer in alkaline developers and a portion of which functional groups are substituted with acid labile groups which inhibit the alkaline solubility of the

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polymer, and a photoinitiator which generates a strong acid upon radiolysis to remove the acid labile groups from the functional groups in the polymer upon exposure to radiation, wherein said acid labile groups inhibiting alkaline solubility represent about 15 to 50% of the total of (a) functional groups contributing to alkaline solubility and (b) acid labile groups inhibiting alkaline solubility.

The examiner relies upon the following references as evidence of obviousness:

Ito et al. (Ito)	4,491,628	Jan. 1, 1985
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Hiroshi Ito (Ito (JPS)), "Solid-State Thermolysis of Poly(*p*-t-Butoxycarbonyl-oxystyrene) Catalyzed by Polymeric Phenol: Effect of Phase Separation," 24 Journal of Polymer Science: Part A: Polymer Chemistry Edition 2971-2980 (1986)

The present application is a continuation of U.S. Application No. 07/933,432, filed August 20, 1992. An appeal was taken in the parent application and in a decision dated October 31, 1996, the Board sustained the examiner's rejection under 35 U.S.C. § 103 over the same prior art presently applied by the examiner (Appeal No. 94-4423).

Appellants' claimed invention is directed to a positive working resist composition comprising a polymer whose functional groups are, in part, substituted with acid labile groups which inhibit the alkaline solubility of the polymer. Appealed claim 1 is narrower in scope than representative claim 1 of the prior

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appeal in reciting that the "acid labile groups inhibiting alkaline solubility represent about 15 to 50% of the total of (a) functional groups contributing to alkaline solubility and (b) acid labile groups inhibiting alkaline solubility." On the other hand, claim 1 on appeal is broader in scope than representative claim 1 of the prior appeal in defining the polymer having the functional groups which contribute to the solubility of the polymer. Claim 1 of the prior appeal defined the polymer as substituted or unsubstituted styrene. Also, the present appeal includes evidence of nonobviousness that was not presented in the earlier appeal.

Appealed claims 1-11 and 23 stand rejected under 35 U.S.C. § 103 as being unpatentable over Ito in view of Ito (JPS).

Appellants submit at page 3 of the Brief that "[t]he claims stand or fall together within each respective issue identified above." Accordingly, all the appealed claims stand or fall together with claim 1, and we will limit our consideration of this appeal to the invention defined by claim 1.

We have thoroughly reviewed each of appellants' arguments for patentability, as well as the evidence of nonobviousness relied upon in support thereof. However, we fully concur with the examiner that the claimed subject matter would have been

obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103 in view of the applied prior art. Accordingly, we will sustain the examiner's rejection for essentially those reasons expressed in the Answer.

As in the prior appeal, we find that the claimed positive working resist composition would have been prima facie obvious to one of ordinary skill in the art in view of the collective teachings of Ito and Ito (JPS). While Ito fails to teach the partial substitution of the functional groups of the polymer with acid labile groups, there is no dispute that Ito (JPS) discloses polymer compositions of the type claimed wherein a portion of the functional groups are substituted with appellants' acid labile groups, specifically, amounts of substitution which fall directly within the claimed range of 15-50%. In particular, Ito (JPS) teaches that when the phenolic functionality of appellants' polymer is located in the vicinity of appellants' *t*-butoxy-carbonyl groups, the thermolysis of the polymer occurs facilely at 130°C (see Synopsis at page 2971). Since Ito (JPS) discloses that such "acid-catalyzed thermolysis has been applied to the design of very sensitive resist materials" (INTRODUCTION, page 2971), we are satisfied that one of ordinary skill in the art would have had the requisite reasonable expectation that the

polymer compositions of Ito (JPS), partially substituted with acid labile groups, would function effectively as a positive working resist composition.

Appellants rely upon specification data, specifically, Examples 2, 7 and 8, as evidence of nonobviousness. For the most part the specification data demonstrates that a partially protected polymer (one in which only a portion of the functional groups is substituted with acid labile groups) performs better in photoresist compositions than a polymer that is fully protected with acid labile groups. We, however, agree with the examiner that the data is non-probative of the nonobviousness of the subject matter on appeal. In addition to appellants not establishing that the specification data would have been considered truly unexpected by one of ordinary skill in the art, the data falls far short of being reasonably commensurate in scope with the degree of protection sought by the appealed claims. In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 778 (Fed. Cir. 1983). As properly noted by the examiner, the specification data is "limited to a resist composition comprising tBOC styrene/hydroxystyrene and a triphenylsulfonium hexafluoro-antimonate photoacid generator" (page 8 of Answer, second paragraph). On the other hand, as documented by appellants' own

citation of the Ito publication of 1998, claim 1 on appeal encompasses a variety of polymers having a variety of functional groups which are substituted with a myriad of acid labile groups. For instance, the 1998 Ito publication cited by appellants discloses a number of different tBOC-protected resist polymers (Fig. 9), and teaches that other blocking groups such as *t*-butyl esters are known in the resist art (page 385, column 1, first paragraph; and page 387, column 1, third paragraph for a teaching of ketal and acetal protecting groups). In addition, Ito evidences that there is a large number of photoinitiators which generate an acid other than the triphenylsulfonium hexafluoroantimonate exemplified by appellants (see page 383, second column, last paragraph). Accordingly, the limited showing found in appellants' specification data does not demonstrate that the large class of resist compositions encompassed by appealed claim 1 would exhibit similar superior results.

Appellants also contend at page 6 of the Brief that the patent to Mertesdorf indicates that those of ordinary skill in the art would have understood Ito (JPS) as teaching away from the use of partially protected polymers in a photoresist. We agree with the examiner, however, that Mertesdorf is not pertinent to how one of ordinary skill in the art would have understood Ito

(JPS) at the time of filing the present application. Moreover, we find that Mertesdorf, rather than teaching away from partially protected polymers, establishes that partially protected polymers were conventional in the photoresist art, although having the disadvantage of exhibiting relatively low thermal stability. But Mertesdorf also teaches that "[o]n the other hand, an increase in protecting-group content is generally accompanied by a decrease in the glass transition temperature T_g of the polymers and thus in the flow resistance as well (dimensional stability of the relief structures produced)" (column 2, lines 37-41). Hence, Mertesdorf teaches that there are advantages and disadvantages of partially protected and fully protected polymers. Indeed, Mertesdorf provides further evidence of the breadth of blocking groups within the scope of the appealed claims.

Appellants also maintain that Ito, "the author of the prior art being applied against the present claims, attributes the concept of partial protection to the present inventors' contemporaneous literature publication, not to Ito's own publication" (page 7 of Brief, second paragraph). However, Ito references an article by Woods, Lyons, Mueller and Conway, whereas the present inventors are Merritt, Moreau and Wood. As for appellants' citation of Przybilla, we agree with the examiner

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that "it can not be assumed the prior art citations in Przybilla include all that is known about partial protection of polyhydroxy styrene in photoresists at the time of publication" (page 11 of Answer, second paragraph). Also, Przybilla is not relevant to the broad scope of the claimed compositions.

Regarding the commercial success argued by appellants, appellants have proffered no objective evidence which establishes the requisite nexus between the purported commercial success and the wide variety of photoresist compositions within the scope of appealed claim 1.

In conclusion, based on the foregoing, it is our judgment that the evidence of obviousness presented by the examiner outweighs the evidence of nonobviousness advanced by appellants. Accordingly, the examiner's decision rejecting the appealed claims is affirmed.

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No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

AFFIRMED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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BRADLEY R. GARRIS)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
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LINDA R. POTEATE)	
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